Welcome
Since launching in 2008 we have engaged with tens of thousands of students, teachers and space industry professionals. We started in Leicester and now deliver all over the world thanks to our expert Lead Educators and Project Scientists.

We believe that every young person should have the opportunity to make STEM (Science, Technology, Engineering and Maths) part of their lives. Space science in particular has a unique and well-established ability to inspire students of all ages.

Our programmes don’t only open doors to careers in the space and wider science and engineering sectors. They also develop a deeper understanding of the universe, and provide young people with the tools to tackle some of our world’s biggest problems.

Qualifications in STEM are high value educational currency in a world where continued prosperity will depend on a future workforce literate in the languages of science and maths.

The National Space Academy builds opportunities by engaging more young people with STEM. We also share our expertise with teachers who wish to do the same. We use the inspirational context of space to teach physics, chemistry, biology, maths and astronomy, and we facilitate pathways into the space and wider science and engineering sectors.

We look forward to working with you.

Professor Anu Ojha OBE
Director of the National Space Academy
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*The National Space Academy team create programmes which are not only inspiring, but show the relevance of STEM subjects for anyone interested in a career in science or engineering in the fast growing UK space sector.*

Jeremy Curtis,  
Head of Education and Skills  
UK Space Agency

*Supported by the UK Space Agency, The National Space Academy is a not-for-profit business unit of The National Space Centre. Registered Charity no. 1078832.*
A National Space Academy Lead Educator tackles tricky subjects with cutting-edge space science. We include recent and historical space missions and show how space exploration affects our daily lives.

Lead Educators are outstanding, award-winning subject-specialist teachers. They are seconded to us from their schools and are based all over the UK.

We will work with you to focus on your specific needs. From working with students struggling to understand complex content, to challenging gifted and talented students and taking groups through revision sessions.

See examples of different topic content on the following pages. Every session can be tailored.

Prices vary depending on length of session and location. Visit nationalspaceacademy.org for more information.

**Every masterclass includes**

- Expert teaching using the inspirational context of space
- Opportunities for student discussion
- Examples of careers relating to the space sector
- Curriculum content
- Practical, hands-on activities
- Exploration of how space science affects our daily lives
- Teamwork, communication and problem solving
Our physics masterclasses use the challenges of space exploration and Earth observation. All of our masterclasses can be tailored to the specific needs of your class.

**Example content for KS3 - 4 and S2 - S4**

- How we get to space: forces, motion and gravity
- The space environment and human survival, temperature, pressure and dangers of radiation
- Why space is important for human society
- Comet impacts and kinetic energy models
- Pollution, climate change and using the electromagnetic spectrum to protect the Earth
- Space industry spin-offs and space careers

**Example content KS5 and S4 - S6**

- Gravity and gravitational fields, equations of motion and Newtonian mechanics
- Human survival in space, planetary atmospheres and ideal gasses
- Electromagnetic phenomena, inverse square law and the photoelectric effect
- The importance of magnetic fields and their interactions with charged particles
- Passive and active Earth observation systems and climate science
- Thermodynamics and spacecraft systems
- Careers in the space industry
Both physical and inorganic chemistry are vital in space research. Organic chemistry is key to understanding the origins of life. A Lead Educator will use examples of chemistry in space contexts.

**Example content for KS3 - 4 and S2 - S4**

- Fuels for space missions, energy density and stability
- Planetary formation and composition, from nebulae to solar systems
- ESA’s ExoMars mission, materials development and the search for life
- Measuring energy changes, rocket motor calorimetry
- Role playing molecules and the chemical processes they undergo in space
- Interpreting and using chemical notation to model molecules found in space
- Quantitative and qualitative analysis of a Martian soil analogue

**Example content KS5 and S4 - S6**

- Rocket propellants, their kinetics and thermodynamics
- Fuel cells and electrochemistry, powering life support systems
- Life Support, closed systems and efficient chemical recycling
- Apollo 13, critical thinking and problem solving
- Spectroscopy, probing the chemistry of the Milky Way and other galaxies
- Chirality and its significance as an indicator of life
- From molecular cloud to complex life, organic chemistry and order out of chaos
The application of biology is vital to answer some of the most exciting space questions: how did life on Earth begin? Is there the potential for life elsewhere in the universe?

Example content for KS3 - 4 and S2 - S4

- What do we mean by life?
- Exoplanets
- Microorganisms
- Respiration, Homeostasis and Nutrition
- Ecosystems
- Osmosis
- Data analysis
- DNA profiling
- Our cosmic backyard: could other planets be habitable?

Example content KS5 and S4 - S6

- Pathways of evolution – how can life adapt to a changing environment?
- Migration – how living organisms can respond to a changing environment
- Earth future – analysing recent climate trends and predicting the future of our climate
- Human impact on the environment
- DNA structure and replication
- Protein synthesis
- Biological molecules
- Microbiology
- Membranes and transport
- Extremophiles
Mathematics

The language of maths underpins the sciences through geometry, algebra, and statistical analysis. We use genuine mathematics problems in space research to allow students to apply and enhance their understanding.

Example content for KS3 - 4 and S2 - S4

- How we get to space: forces, motion and gravity
- Why space is important for human society
- How to plan a mission to space
- The size of the universe
- Space industry spin-offs and space careers

Example content KS5 and S4 - S6

- Understanding gravity and gravitational fields, equations of motion and Newtonian mechanics
- How we measure the universe
- Historical implications of getting science wrong
- Navigation on planets
- Statistical analysis of exoplanets
- Careers in the space industry

"I believe that mathematics should be taught both as a discrete subject but also in a cross-curricular manner. That way students can see how to use Mathematics as a tool to solve problems posed in other subject areas."

Nicole Cozens, Maths Lead Educator, National Space Academy
Astronomy masterclasses at the National Space Centre make use of the planetarium allowing us to discuss in great detail constellations and coordinate systems. As with all our masterclasses, we can also come to your school. We can deliver sessions for teachers if you’re looking for new ways to get the most out of your on-site observatory or planetarium.

**Topics could include:**

- Coordinate systems
- Multi-spectral astronomy
- The scale of the universe
- Parallax
- Stellar evolution
- Comets and meteors
- Magnitudes, Cepheid variables and other light curves
- Big Bang Theory
- Kepler’s laws
- Exoplanets
- The Drake equation and life in the universe

“The students really enjoyed themselves and learned lots of interesting things about space and space exploration - I'm sure I'm going to be fielding questions until the end of the year... you really were fantastic, you kept all the students engaged and learning the whole day! Not a small feat!”

**Graham Johnston**  
Assistant Head for Achievement  
Farnborough College
Bespoke

There might be a specific topic you would like us to focus on, or an area of the curriculum which your group are struggling with. An expert Lead Educator can come to your school anywhere in the UK or you can visit us at the National Space Centre in Leicester.

Our Lead Educators are current teachers, who have won awards for their practise and expertise. If you have a big idea, let us know and we’ll see what we can do!

You will have the opportunity to speak directly to a Lead Educator ahead of your session and work with them to build a bespoke day of learning suited to your school and students.

We have delivered mega-masterclasses with multiple groups and Lead Educators, as well as smaller-scale masterclasses in unique venues all over the world.
The UK space industry employs tens of thousands of people and has an income of billions of pounds. The government aims for the UK to make up 10% of the global space economy by 2030. As technology advances and space applications become more ambitious, new jobs are being created all the time.

Our careers events provide opportunities for students to meet people working in the space sector; from scientists to space engineers; astronomers to astrophysicists. We have connections with companies like Airbus, Rolls Royce, the RAF, RAL Space, Satellite Applications Catapult and leading universities across the UK who send representatives to discuss all things space science with young people attending our careers events.

There are many paths to a career in the space sector, and many options once you get there. We take a closer look at some of these options and provide opportunity for discussion; so that students are able to explore where science, technology, engineering and maths might take them.

“Fantastic and well organised event. Students got the chance to meet scientists and researchers. Honest and good advice about university courses and relevant jobs.”

Teacher at Year 12 Careers Conference
Travel to the National Space Centre for an out-of-this-world careers event

Who is it for?

11-19 yrs

One year group per session.

In groups of

10 - 30

Duration

9:30 - to - 15:30

FREE*

Students will learn about the space sector and the diversity of careers available. We'll hear from scientists, academics and engineers who have taken different career paths to realise their roles within the space sector.

- Science busking from Space Interpreters at the National Space Centre
- Talks and workshops with people currently working in the space sector
- Explore the National Space Centre
- Question and Answer sessions
- Keynote presentation from a key figure in the space sector.

We have previously heard from Dr Helen Sharman, Dr Suzie Imber and Libby Jackson.

*Some are currently free thanks to funding from the UK Space Agency and other supporters. Visit nationalspaceacademy.org for information on dates and prices

“Gives students food for thought on careers they didn't even know existed

Teacher at Year 12 Careers Conference
Create a bespoke careers event at your school

Who is it for?

11-19 yrs
One year group per session.

In groups of

Flexible
We can work around your numbers. We suggest 150 for a full day

Duration

Full day
Half day
One-hour workshop sessions

From one hour workshops, to talks, keynotes and panel discussions, we can tailor a full day to fit in with your students and The Gatsby Benchmarks*.

We can bring in Project Scientists, Lead Educators and industry professionals from across the UK to create a truly inspirational and informative event. Students will discover careers they never knew existed!

Prices are dependent on times, number of participants and location.

Contact us today to discuss your requirements and we’ll begin to build a bespoke careers event relevant to your students.

*Visit careersandenterprise.co.uk/schools-and-colleges

It was very interesting and it really opened my eyes to the different career paths you could take.

Year 10 student
During our intensive CPD sessions we share a large range of inspiring, curriculum-focused, hands-on activities. We discuss and share teaching ideas and tips for integrating space into your classroom teaching and give you access to electronic resources that can be immediately implemented.

We can run specific sessions for biology, physics, maths, chemistry or astronomy teachers. We can tailor sessions for those teaching across the sciences and outside of specialism.

We have also worked with universities to deliver sessions for their PGCE students, both at university and at the National Space Centre in Leicester. Our CPD sessions are world-class. We have delivered CPD for teachers in the UK, China, the UAE, Poland, the Netherlands and the USA.

Prices vary depending on length of session and location. Visit nationalspaceacademy.org for more information.

"Our trainee science teachers were really inspired by their Space Day. They certainly left full of ideas to try out in their own classrooms in the future. The activities presented were realistic and practical and helped them understand how they could help pupils learning about difficult concepts."

Lesley Paris, Lecturer in Science Education, University of Leicester
Planning an important assembly or event at your school? Need something to get students, teachers or parents thinking, talking and asking questions?

We have a number of experts here at the National Space Academy who would love to talk about the topics they are passionate about.

Business rates for our speakers start at £275 for one hour plus expenses but these prices can be negotiated for schools.

We want to help you educate and inspire the next generation of space scientists!

Lead Educators

Outstanding subject-specialist teachers who have won awards and have been recognised nationally for their excellent and inspirational teaching. They are based all over the UK, they can come to your school, and talk to students or teachers about exciting space topics. Our Lead Educators have represented us at the Royal Institute, New Scientist Live, space school camps and school space days.
Anu spent 15 years in full-time teaching, including as an Advanced Skills Teacher (AST), Assistant Headteacher and National Lead Practitioner (Physics) for the UK Specialist Schools and Academies Trust. He is now Director of the National Space Academy, an honorary professor at the University of Leicester and is on the advisory committee for Human Spaceflight and Exploration Science at the European Space Agency.

_Favourite talk topic:_
“The secret rulers of the world”

After studying for a PhD in Nanotechnology at Swansea University Kierann took on the role of General Manager of the National Space Academy. Kierann is also on the Institute of Physics Outreach and Public Engagement Network Advisory Group and the Royal Astronomical Society Education and Outreach Committee. Kierann won the Women in Science Award in 2018.

_Favourite talk topic:_
Practical careers lessons from the space sector’s “Hidden Figures”

Sophie teaches physics and astronomy on our pioneering Space Engineering course. She also delivers lectures and workshops all over the world. Sophie has led on the development of Space Education programmes for organisations such as the European Space Agency, Science and Technology Facilities Council and the Association for Science and Discovery Centres.

_Favourite talk topic:_
Science: where the movies get it wrong
Resources

We’ve worked with many organisations, scientists and teachers to develop educational resources and activities.

Thanks to funding and the people we have worked with, many of these are free to use in school, youth groups and at home. These resources cover tricky topics and curriculum subjects for biology, chemistry, physics and maths.

You can find information about our funders, our supporters and some of the projects we’ve worked on at nationalspaceacademy.org.

Get in touch if you have a project or resource idea which we could help with!

MarsQuake
A UK Space Agency-funded initiative led by the British Geological Survey. These classroom activities and learning resources use data from the NASA InSight mission to Mars.

Borrow the Moon
This Science and Technology Facilities Council project has lent the NASA Moon rock discs and meteorites to thousands of schools, museums and outreach organisers.

Astro Academy: Principia
A series of simple demonstrations that Tim Peake conducted and filmed whilst on the ISS. They show fundamental aspects of physics and chemistry.
Get in touch

If you have any questions about anything space-related, about our programmes, or about something that isn’t listed which you’d like to see at your school, please get in touch.

For bookings and enquiries visit nationalspaceacademy.org

Email us
nsa@spacecentre.co.uk

Call us
0116 258 2147

Send us a letter
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National Space Centre,
Exploration Drive,
Leicester, LE4 5NS

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nationalspaceacademy.org/hello
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